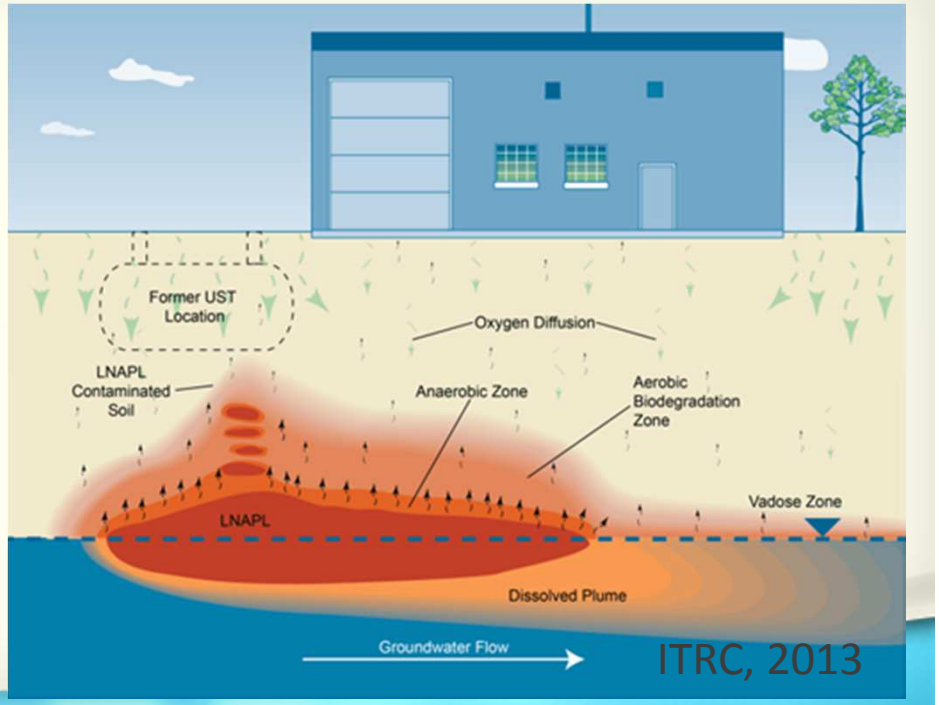
PART 213 AND VAPOR INTRUSION



ITRC, 2013

Petroleum Vapor Intrusion Workshops

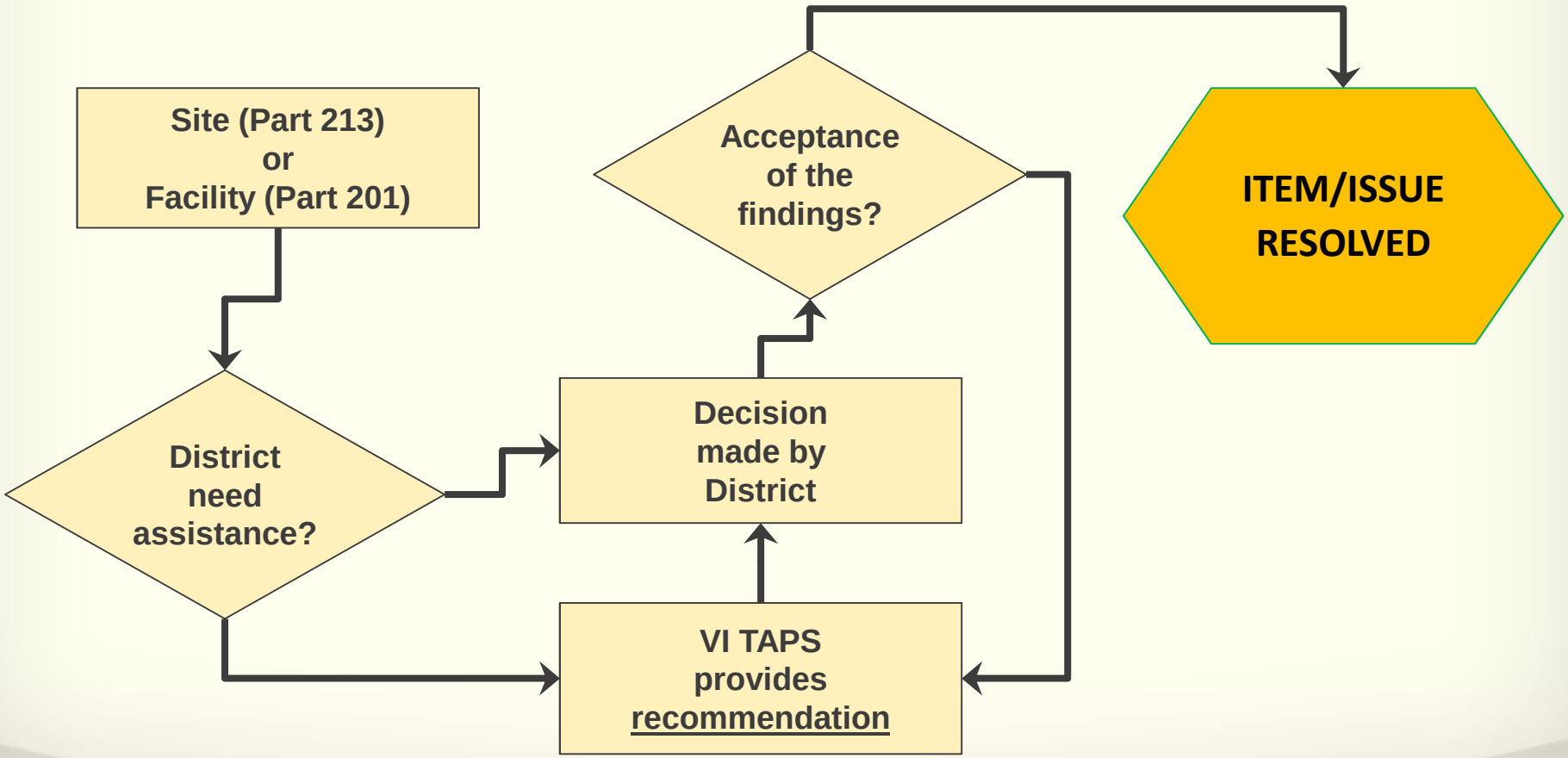
December 4 and 5, 2013

Department of Environmental Quality
PURE MICHIGAN

Matthew Williams
Vapor Intrusion Specialist
Remediation & Redevelopment Division

Part 213 and VI

RRD Project Review Process



Goals and Objective

- Identify latest information about PVI from ITRC
  - Can we “screen-out” sites without further evaluation?
- Will it work under Part 213?

Generic Criteria

- GVIIC and SVIIC
  - Can be used when the generic criteria apply
  - Were not developed to evaluate NAPL
- Checklist C.2 for assistance

ITRC's Starting Point

FEW

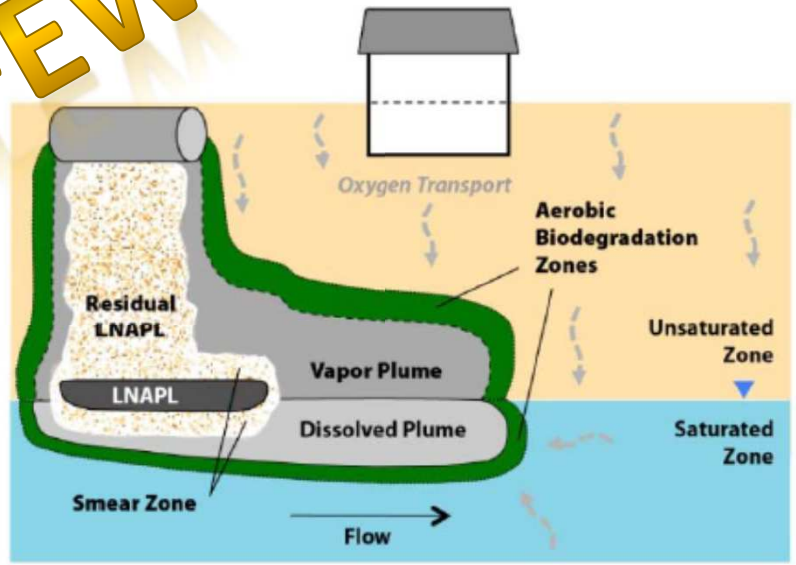


Figure 1. Typical petroleum hydrocarbon transport conceptual scenario

MORE

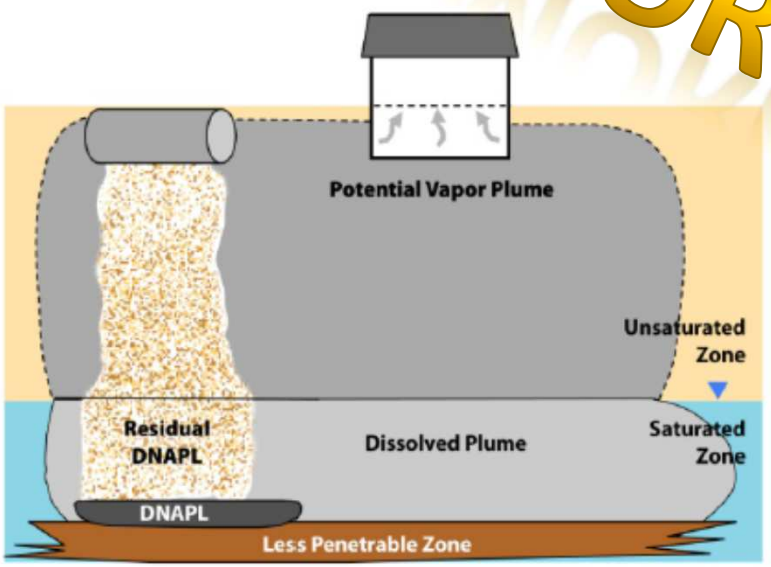
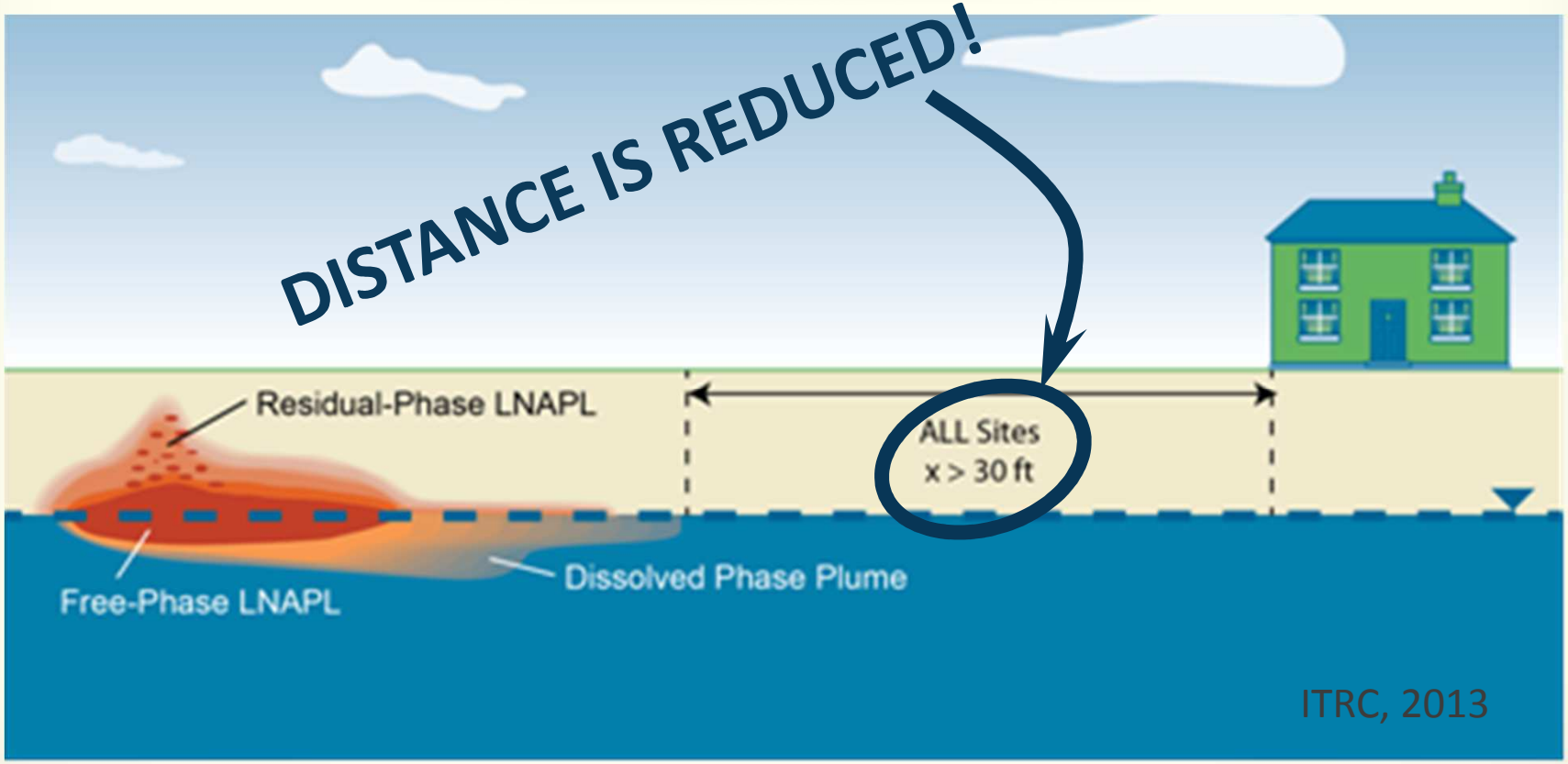


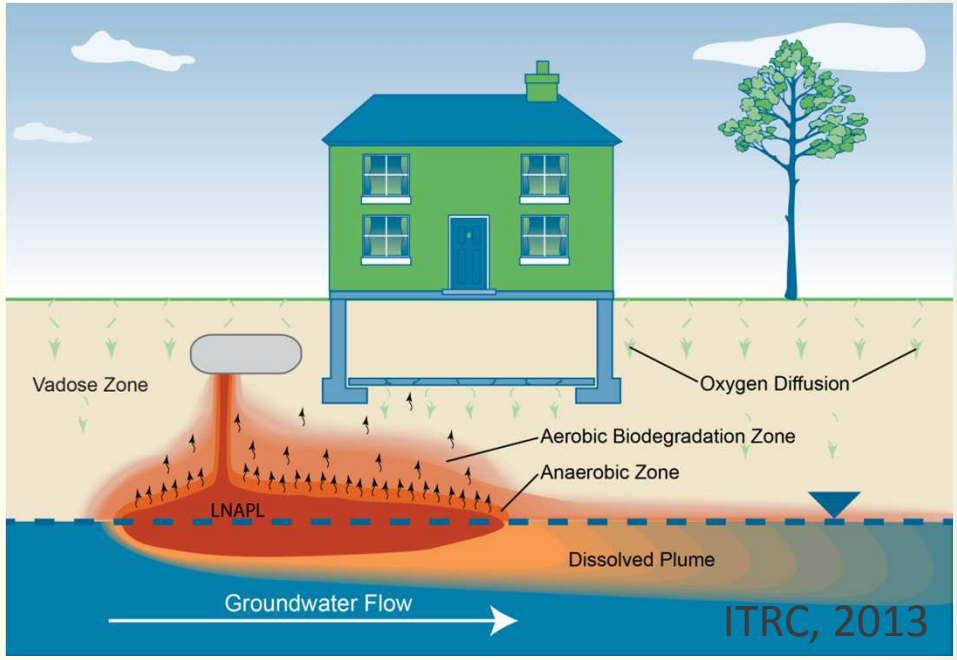
Figure 2. Typical chlorinated solvent transport conceptual scenario

Preliminary Screening Distance

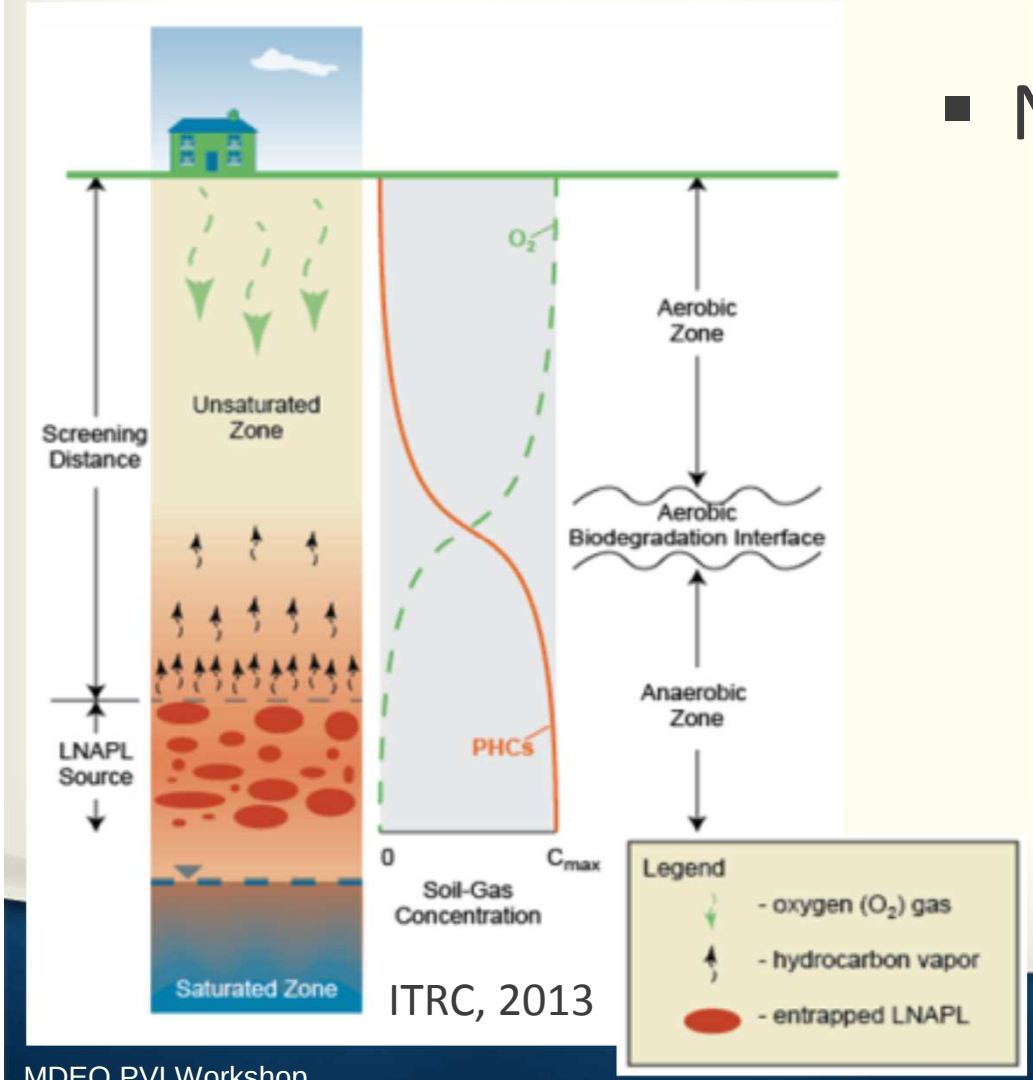


Exclusion Distance

- Meets Distance
  - VI risk unlikely
- IMPORTANT
  - NAPL or Dissolved
  - CSM
  - Precluding Factors



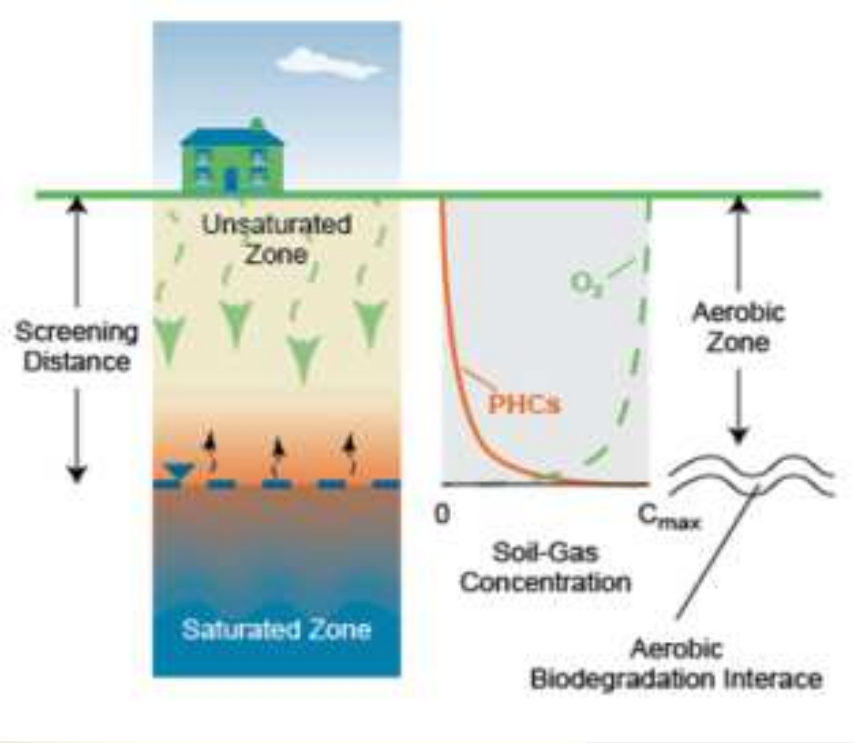
Exclusion Distances



ITRC, 2013

- NAPL – 15'
  - Meet distance, VI will not occur at structure
  - Meet other "precluding factors"

Exclusion Distances

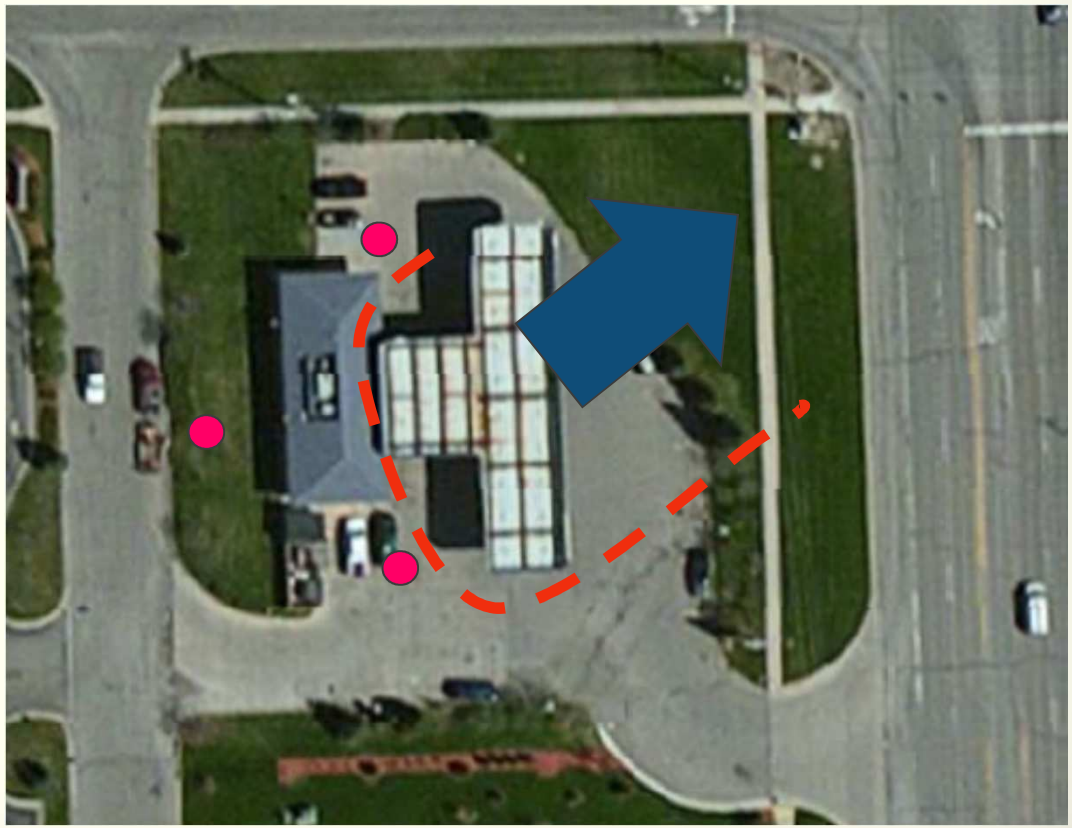


ITRC, 2013

- Dissolved-phase – 6’
  - Meet distance, VI will not occur at structure
  - Meet other “precluding factors”

Exclusion Distances

- CSM
- Characterization



Precluding Factors for Exclusion Distances

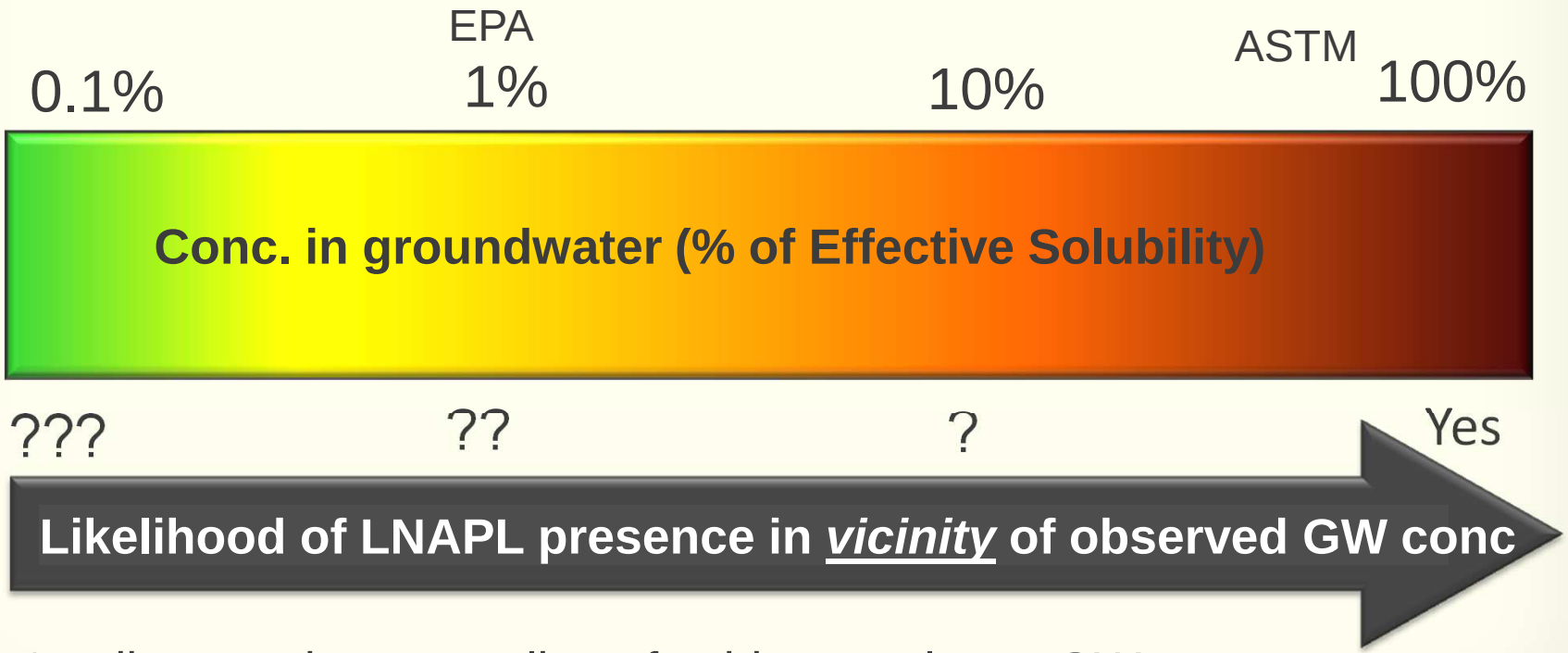
- Preferential pathways
- On-going release
- Lead scavengers (EDC or EDB) or >10% ethanol
- Soils with High Organic Content (e.g. peat)

NAPL – Key Component

- NAPL present at the site
  - Release occurred from NAPL
  - Easy when NAPL or a sheen is observed
  - Persistent groundwater plume
  - Others. . .

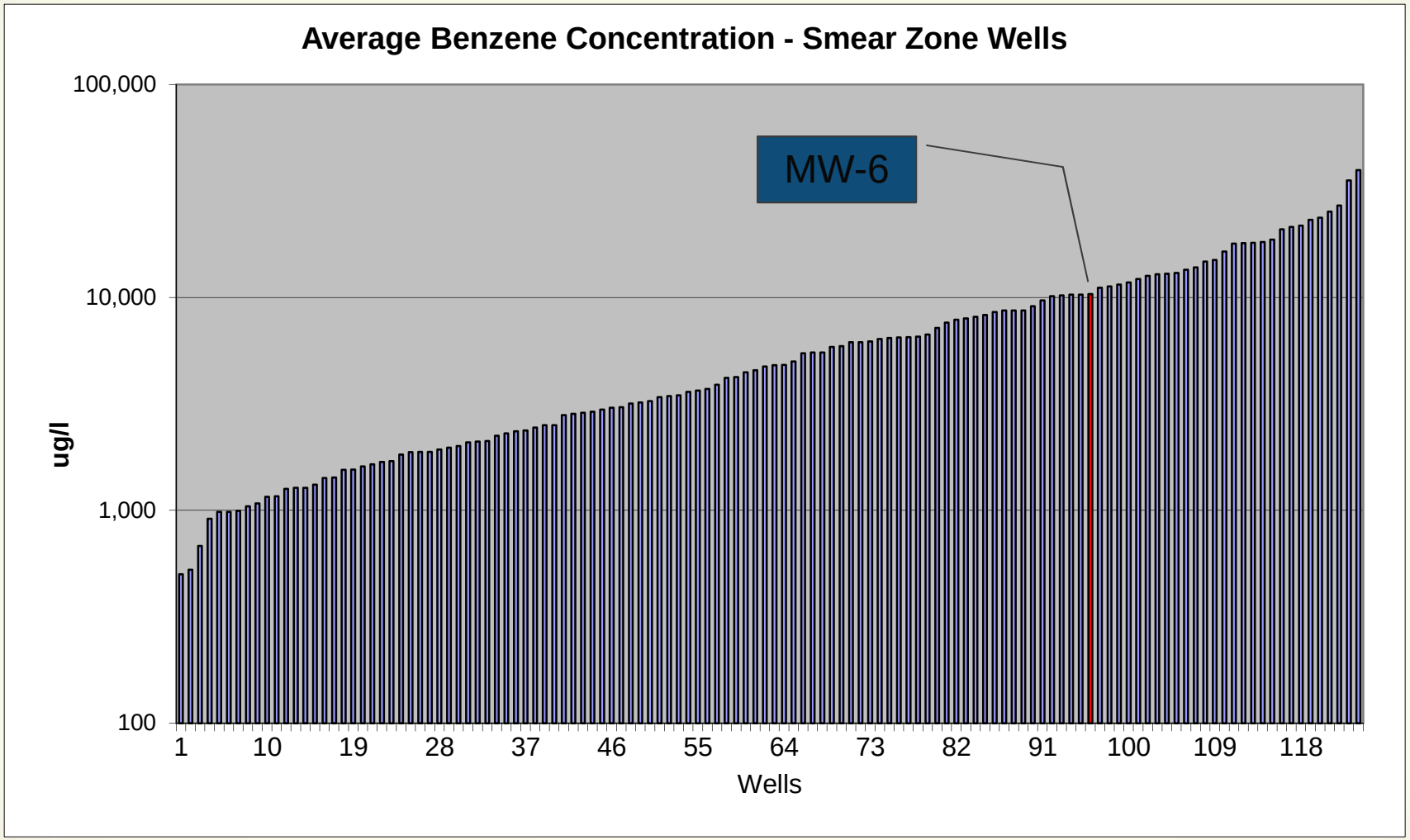
Groundwater Concentrations As A Possible Indicator Of LNAPL

Indicator: Dissolved Phase



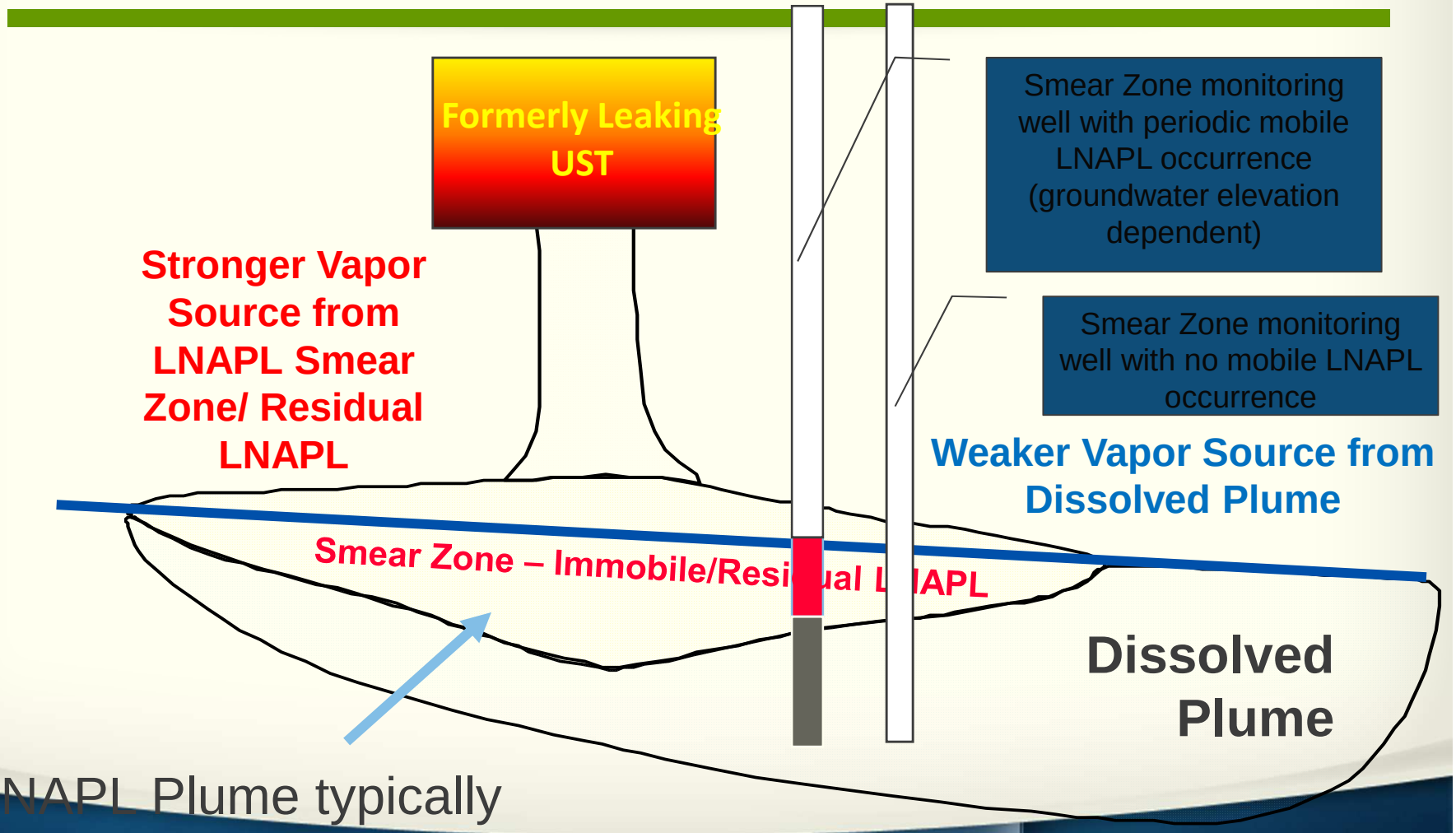
* Indirect and one way line of evidence – lower GW conc. does not necessarily mean LNAPL not present.

GW – groundwater, conc - concentration



Plotting average benzene concentrations for 123 Smear Zone wells shows only 4 wells less than 1,000 ug/l.

NAPL CSM - Source Strength



LNAPL Plume typically stable or shrinking for older UST release sites

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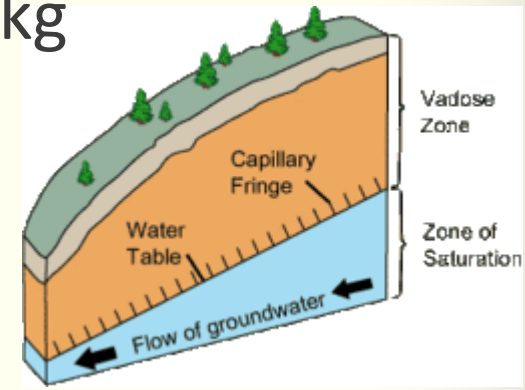
NAPL in the Vadose Zone

- Can be challenging
- MDEQ has adopted (from API Bulletin 9)
  - 100 mg/kg (sand/gravel) and 200 mg/kg (silt/clay) for TPH-GRO
  - 5 mg/kg (sand/gravel) and 18 mg/kg (silt/clay) for TPH-DRO
  - will assume NAPL is not present at or below values.



NAPL Indicators

- Lines of evidence
  - Dye Testing (e.g. Sudan IV)
  - Laser Induced Fluorescence
  - Ultra Violet Light Photography/Screening
  - Proximity to unsaturated-zone sources of PHCs

Additional NAPL Info

Nick Swiger

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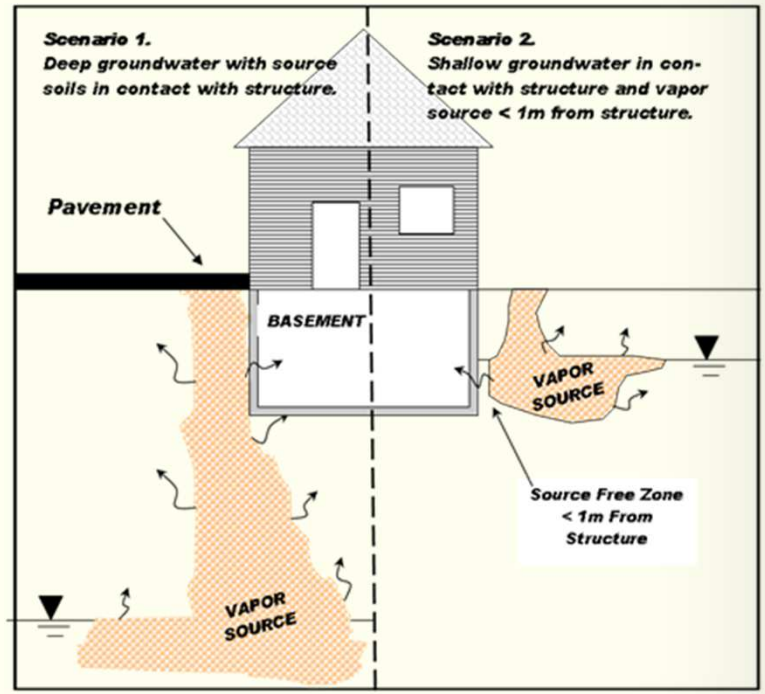
(231)876-4458

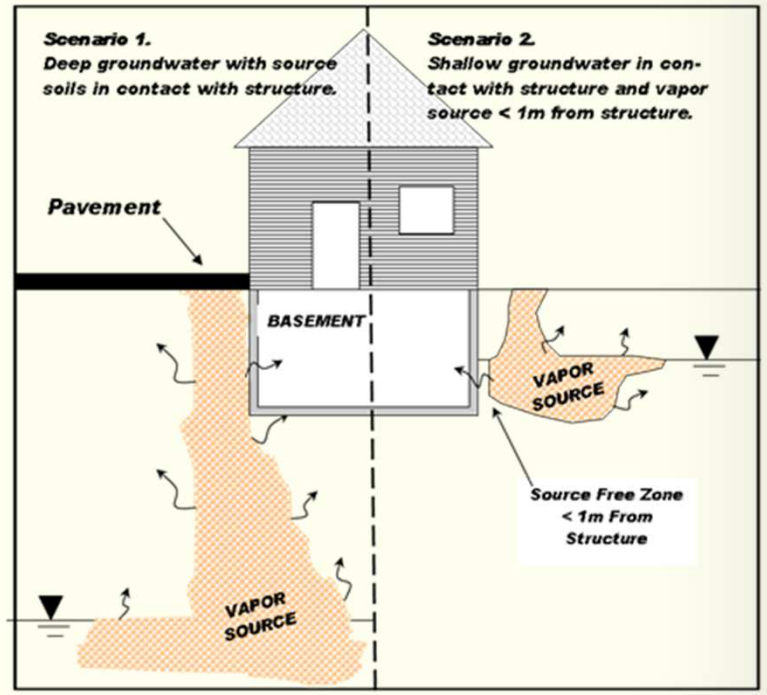
Exclusion Criteria Can't be Met

- Source in Vadose Zone
  - Generic Criteria (when they apply)
  - Develop site specific criteria
    - Could use DEQ's Screening Values for soil or soil gas



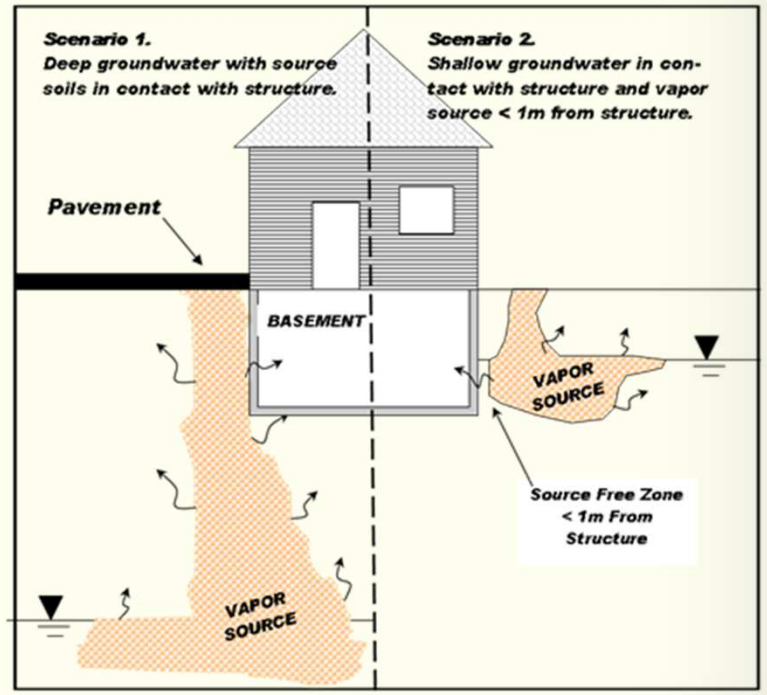
Exclusion Criteria Can't be Met

- Source in Groundwater
  - Generic Criteria would not apply
  - Develop site specific criteria
    - Could use DEQ's Screening Values for groundwater or soil gas



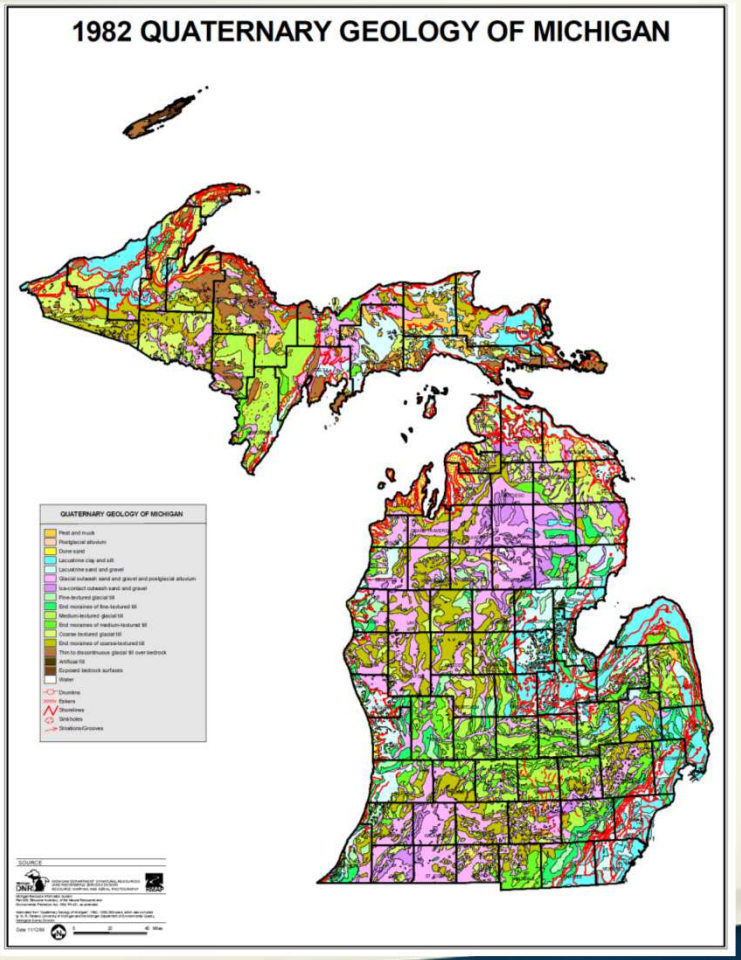
Exclusion Criteria Can't be Met

- Source in Groundwater (cont.)
  - Other options:
    - Collection of soil gas vertical profiles near the structure.
    - Modeling of site conditions using BioVapor



ITRC's Approach

- Potential to **reduce** the number of structures that need to be evaluated for PVI
- Michigan Factors
  - Geology
  - Location



Some Additional Information

- Guidance Document
- SOPs
- Analytical Methods
- Generic Criteria
- Closure Considerations
- More. . .

2013 Guidance Document

- Written from the perspective of closure
- NOT a requirement – even for closure
- Alternate approaches can be proposed

Standard Operating Procedures

GOAL: Collect RELIABLE, REPEATABLE and DEFENSIBLE data

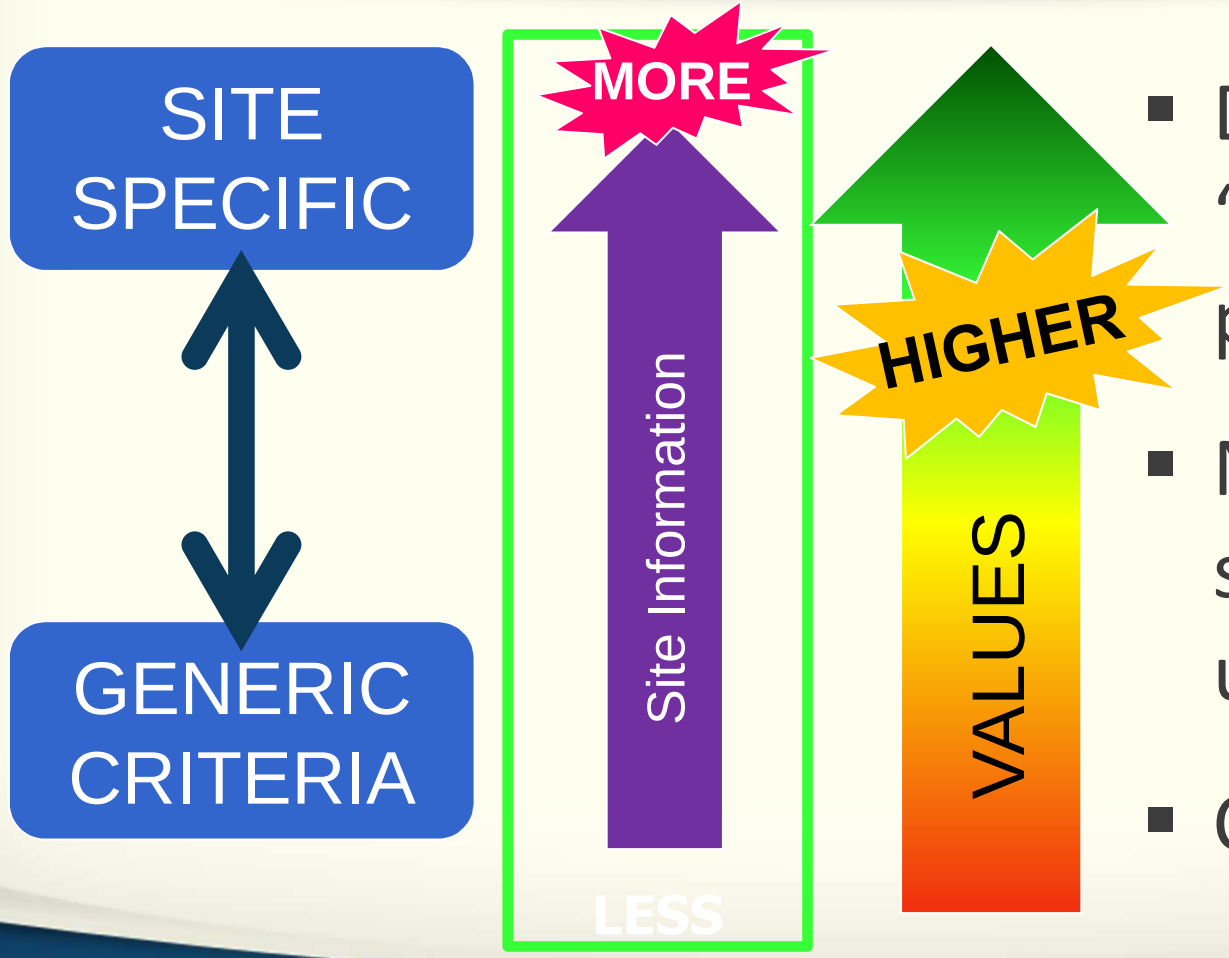
- Don't have to use MDEQ's SOPs
  - Our contractors do. . .
- Only a reference for the regulated community
- Lots of other great sampling methods out there!

Analytical Methods

GOAL: Collect RELIABLE, REPEATABLE and DEFENSIBLE data

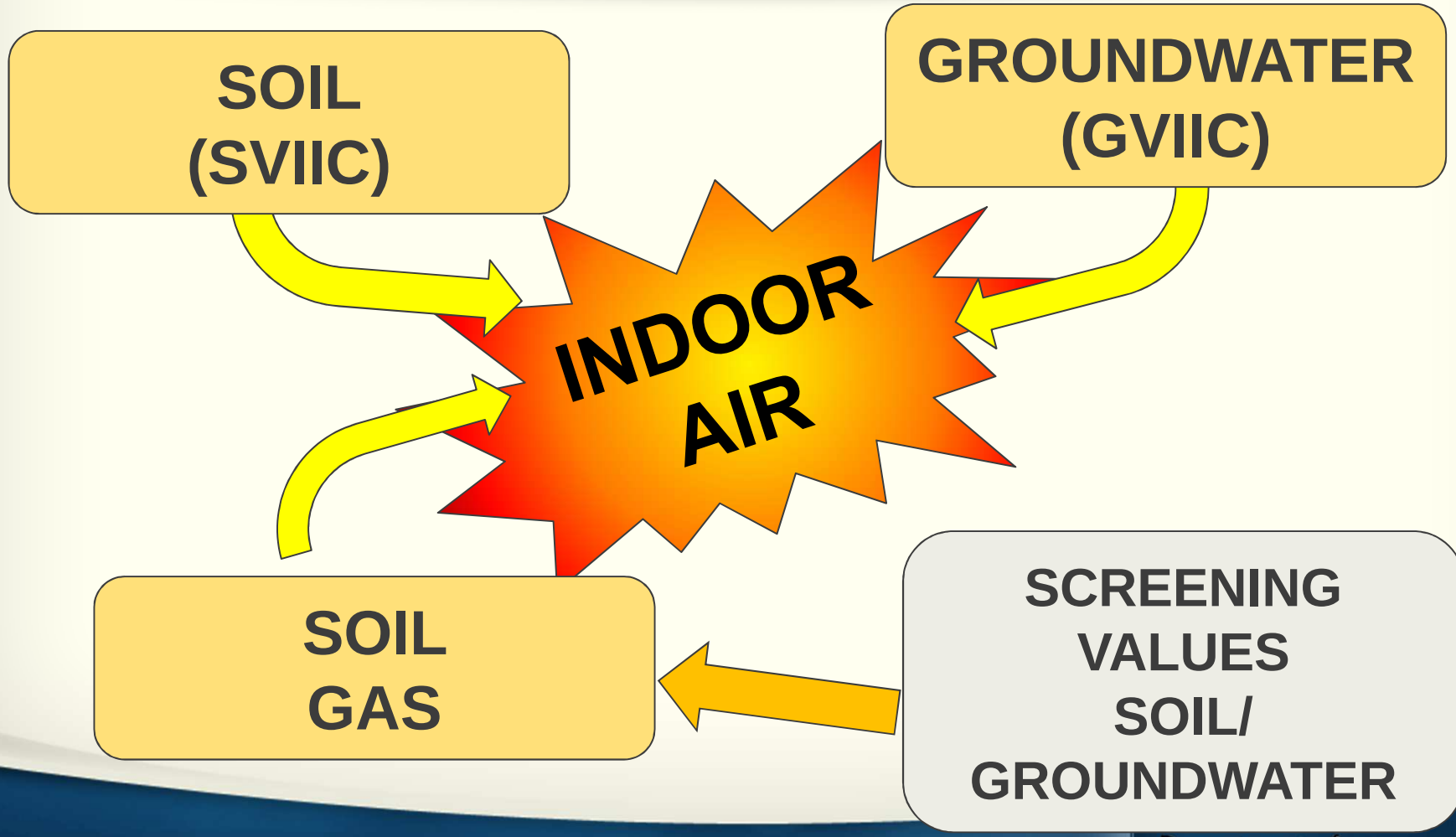
- Others may be recommended. . .but justification is necessary
- Depends on the purpose of the sampling event
- For air samples. . . use a lab that "knows" air

Site Specific vs. Generic Criteria



- Degree of "conservatism" present
- Number of sites it can be used at
- Caveats?

Comparing Values



Modeled Concentrations

$$GVIIC = \frac{THQ \times AT}{(1/ITSL) \times EF \times ED \times CR^{gw}_{source} \times \alpha}$$

Empirical Data

Models

EPA Database 2013

$$\alpha = \frac{\left[\left[\frac{D_T^{eff} A_b}{Q_{building} L_T}\right] \times \exp\left(\frac{Q_{soil} L_{crack}}{D^{crack} A_{crack}}\right)\right]}{\left[\exp\left(\frac{Q_{soil} L_{crack}}{D^{crack} A_{crack}}\right) + \left[\frac{D_T^{eff} A_b}{Q_{building} L_T}\right] + \left[\frac{D_T^{eff} A_b}{Q_{soil} L_T}\right]\left[\exp\left(\frac{Q_{soil} L_{crack}}{D^{crack} A_{crack}}\right) - 1\right]\right]}$$

Part 213 Closure Considerations

- Pathway is Relevant
- Distances may help establish whether it is applicable
- Deed Restrictions
- Guidance provided in Appendix H

More . . .

- VI Webpage
  - MDEQ VI Information
  - Updates on SOPs
  - Alternate procedures like Investigating Vapors for Petroleum Hydrocarbons considering Biodegradations
- Additional training opportunities/workshops
- More

Some things to remember (cont.)

- Characterization vs. Conclusions
  - "Point Location" vs. "Source Location"
  - "Lines of Evidence" vs. "Weight of Evidence"
  - Data contouring
  - Understand the CSM
  - Understand what data you need

Some things to remember

- Understand what your field readings are saying
- Say what you did, not you followed something
- Knowledge and experience
- Understand method to develop your QA/QC
- Look at more than the lab “numbers”
- One size does not fit all!

THANK-YOU!

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